

Abstract

A synchronization of a pilot assisted channel estimation orthogonal frequency division multiplexing can be achieved by receiving a signal containing pilot symbols, providing an initial time and frequency synchronization to the signal, phase rotating the signal across time, transforming the signal with a fast Fourier transformation, phase rotating the signal across frequency, extracting the pilot symbols and generating a channel estimator. The phase rotating across time and the phase rotating across frequency are controlled by a phase rotation controller in accordance with the channel estimator. The initial time and frequency synchronization synchronizes the signal such that intercarrier interference effects and intersymbol interference effects are negligible. The signal may include plural carrier frequencies each having an arrival timing offset and a frequency offset. The signal may also include delay spread or Doppler spread. The phase rotation controller measures a phase difference between the channel estimator at times k and $k + \Delta k$, where k is time and Δk is a symbol period and measures a phase difference between the channel estimator at frequencies n and $n + \Delta n$, where n is tone frequency and Δn is a frequency spacing between adjacent tones.